



<110> Uefuji, Hirotaka
Sano, Hiroshi
Koizumi, Nozumu
Shinmyo, Atsuhiko

<120> Composite Utilization of a group of genes in biosynthetic Pathway
of Caffeine

<130> KSM-0216

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<170> PatentIn version 3.2

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<302> 7-Methylxanthine Methyltransferase of Coffee Plants, Gene
Isolation and Enzymatic Properties
<303> Journal of Biological Chemistry
<304> 276
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<306> 8213-8218
<307> 2001-03-16
<308> BAB39215
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Val Gly Gln Glu Glu Lys Asn Glu Leu Glu Arg Pro Thr Ile Gln Ile	
85 90 95	
uuu cug aaU gau cuu uuc caa aaU gau uuc aaU ucg guu uuc aag uug	336
Phe Leu Asn Asp Leu Phe Gln Asn Asp Phe Asn Ser Val Phe Lys Leu	
100 105 110	
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Leu Pro Ser Phe Tyr Arg Lys Leu Glu Lys Glu Asn Gly Arg Lys Ile	
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115			120			125												
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Gly	Ser	Cys	Leu	Ile	Ser	Ala	Met	Pro	Gly	Ser	Phe	Tyr	Gly	Arg	Leu			
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uuc	ccc	gag	gag	ucc	aug	cau	uuu	uug	cac	ucu	ugu	uac	agu	guu	cau			480
Phe	Pro	Glu	Glu	Ser	Met	His	Phe	Leu	His	Ser	Cys	Tyr	Ser	Val	His			
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Trp	Leu	Ser	Gln	Val	Pro	Ser	Gly	Leu	Val	Ile	Glu	Leu	Gly	Ile	Gly			
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gca	aac	aaa	ggg	agu	auu	uac	ucu	ucc	aaa	gca	agu	cgu	ccg	ccc	guc			576
Ala	Asn	Lys	Gly	Ser	Ile	Tyr	Ser	Ser	Lys	Ala	Ser	Arg	Pro	Pro	Val			
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Gln	Lys	Ala	Tyr	Leu	Asp	Gln	Phe	Thr	Lys	Asp	Phe	Thr	Thr	Phe	Leu			
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Arg	Ile	His	Ser	Lys	Glu	Leu	Phe	Ser	Arg	Gly	Arg	Met	Leu	Leu	Thr			
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Cys	Ile	Cys	Lys	Val	Asp	Glu	Tyr	Asp	Glu	Pro	Asn	Pro	Leu	Asp	Leu			
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cuu	gac	aug	gca	aua	aac	gac	uug	auu	guu	gag	gga	cau	cug	gag	gaa			768
Leu	Asp	Met	Ala	Ile	Asn	Asp	Leu	Ile	Val	Glu	Gly	His	Leu	Glu	Glu			
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gaa	aaa	uug	gcu	agu	uuc	aau	cuu	cca	uuc	uuu	aca	ccu	uca	gca	gaa			816
Glu	Lys	Leu	Ala	Ser	Phe	Asn	Leu	Pro	Phe	Phe	Thr	Pro	Ser	Ala	Glu			
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Glu	Val	Lys	Cys	Ile	Val	Glu	Glu	Glu	Gly	Ser	Phe	Glu	Ile	Leu	Tyr			
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cug	gag	acu	uuu	aag	gcc	cau	uau	gau	gcu	ggc	uuc	ucu	auu	gau	gau			912
Leu	Glu	Thr	Phe	Lys	Ala	His	Tyr	Asp	Ala	Gly	Phe	Ser	Ile	Asp	Asp			
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Asp	Tyr	Pro	Val	Arg	Ser	His	Phe	Gln	Val	Tyr	Gly	Asp	Glu	His	Ile			
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Lys	Ala	Glu	Tyr	Val	Ala	Ser	Leu	Ile	Arg	Ser	Val	Tyr	Glu	Pro	Ile			
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cuc	gca	agu	cau	uuu	gga	gaa	gcu	auu	aug	ccu	gac	uua	uuc	cac	agg			1056
Leu	Ala	Ser	His	Phe	Gly	Glu	Ala	Ile	Met	Pro	Asp	Leu	Phe	His	Arg			
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cuu	gcg	aag	cau	gca	gca	aag	guu	cuc	cac	uug	ggc	aaa	ggc	ugc	uau			1104
Leu	Ala	Lys	His	Ala	Ala	Lys	Val	Leu	His	Leu	Gly	Lys	Gly	Cys	Tyr			
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aau	aau	cuu	auc	auu	ucu	cuc	gcc	aaa	aag	cca	gag	aag	uca	gac	gug			1152
Asn	Asn	Leu	Ile	Ile	Ser	Leu	Ala	Lys	Lys	Pro	Glu	Lys	Ser	Asp	Val			
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 Asn Ile Asn Lys Cys Ile Lys Val Ala Asp Leu Gly Cys Ala Ser Gly
 50 55 60
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 65 70 75 80
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 Gln Lys Ala Tyr Leu Asp Gln Phe Thr Lys Asp Phe Thr Thr Phe Leu
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 Arg Ile His Ser Glu Glu Leu Ile Ser Arg Gly Arg Met Leu Leu Thr
 210 215 220
 Trp Ile Cys Lys Glu Asp Glu Phe Glu Asn Pro Asn Ser Ile Asp Leu
 225 230 235 240
 Leu Glu Met Ser Ile Asn Asp Leu Val Ile Glu Gly His Leu Glu Glu
 245 250 255

Glu Lys Leu Asp Ser Phe Asn Val Pro Ile Tyr Ala Pro Ser Thr Glu
260 265 270

Glu Val Lys Cys Ile Val Glu Glu Gly Ser Phe Glu Ile Leu Tyr
275 280 285

Leu Glu Thr Phe Lys Val Pro Tyr Asp Ala Gly Phe Ser Ile Asp Asp
290 295 300

Asp Tyr Gln Gly Arg Ser His Ser Pro Val Ser Cys Asp Glu His Ala
305 310 315 320

Arg Ala Ala His Val Ala Ser Val Val Arg Ser Ile Phe Glu Pro Ile
325 330 335

Val Ala Ser His Phe Gly Glu Ala Ile Met Pro Asp Leu Ser His Arg
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Ser Tyr Ala Lys Asn Ser Phe Tyr Asn Leu Phe Leu Ile Arg Val Lys	
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Pro Ile Leu Glu Gln Cys Ile Gln Glu Leu Leu Arg Ala Asn Leu Pro	
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Asn Ile Asn Lys Cys Ile Lys Val Ala Asp Leu Gly Cys Ala Ser Gly	
50 55 60	
cca aac aca ctt tta aca gtt cgg gac att gta caa agt att gac aaa	240
Pro Asn Thr Leu Leu Thr Val Arg Asp Ile Val Gln Ser Ile Asp Lys	
65 70 75 80	
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Val Gly Gln Glu Lys Lys Asn Glu Leu Glu Arg Pro Thr Ile Gln Ile	
85 90 95	

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Leu	Pro	Ser 115	Phe	Tyr	Arg	Lys	Leu 120	Glu	Lys	Glu	Asn	Gly 125	Arg	Lys	Ile	
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Gly	Ser 130	Cys	Leu	Ile	Gly	Ala 135	Met	Pro	Gly	Ser	Phe 140	Tyr	Gly	Arg	Leu	
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 Pro Ile Leu Glu Gln Cys Ile Gln Glu Leu Leu Arg Ala Asn Leu Pro
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 Pro Asn Thr Leu Leu Thr Val Arg Asp Ile Val Gln Ser Ile Asp Lys
 65 70 75 80
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 Val Gly Gln Glu Lys Lys Asn Glu Leu Glu Arg Pro Thr Ile Gln Ile
 85 90 95
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